Revision #2
Application for a
Prevention of Significant
Deterioration (PSD) Air
Permit – Proposed Scrap
to Steel Plant – Big River
Steel LLC

APPENDIX D –

BACKUP DOCUMENTATION – OZONE IMPACT ANALYSIS

Proposed Big River Steel LLC Scrap to Steel Products Plant Mississippi County, Arkansas

CORRESPONDENCE/MEMORANDUM — State of Wisconsin

DATE: November 6, 2012

FILE REF: 4530
FID: 469033840

TO: Paul Yeung – AM/7

FROM: John Roth – AM/7

SUBJECT: Revised Ozone Air Quality Analysis for a PSD Permit for Waupaca Foundry Plant 2/3

A. INTRODUCTION

Ozone is a photochemical pollutant that is not generally emitted directly from sources, but is a secondary pollutant created through complex reactions, primarily from volatile organic compounds (VOCs) and oxides of nitrogen (NO_x). This complex chemistry is well understood but has historically presented significant challenges to the designation of particular models for assessing the impacts of individual stationary sources for the formation of this pollutant. Since formation of ozone takes place over tens to hundreds of kilometers downwind from sources, regional models have been developed to simulate ozone levels over large areas. These models have worked well and have been used to develop strategies for reducing VOCs and NO_x in order to attain the ozone ambient air quality standards. Changes from additions of individual sources have not shown any impact in these regional models.

Waupaca Foundry is proposing to increase their potential emissions relative to their historical actual emissions by 40 tons of VOC and 19 tons of NO_x per year, including a minor source construction permit issued earlier in 2012. The analysis set forth below demonstrates that the total increase of emission (46 tons per year potential increase over actual) would not have an effect on the attainment status of the area.

B. POINT SOURCE INVENTORY

Examining the point source emissions in the Waupaca County area (Brown, Oconto, Outagamie, Shawano, Waupaca Counties) for 2010, VOC and NO_x emissions account for 13,997 tons per year. Waupaca Foundry's potential emission increase for both permits and both pollutants would represent 0.4% of the total of NO_x and VOC point source emissions for the region. If other potential ozone precursor emitting sources are included, such as biogenic, area, and on/off road mobile source emissions for this county, this would decrease the percentage of Waupaca Foundry's overall potential contribution for ozone formation. While production of ozone is not a linear relationship to emissions, analysis of Waupaca Foundry's emissions demonstrates the impacts of this project will be below detectable levels. Because it will be emitting 0.4% of the emissions for the region, its ozone contribution would be minimal.

C. OZONE MODELING - LADCO

The closest ozone monitors to Waupaca Foundry are those located in Appleton (Outagamie County) and Green Bay (Brown County). Ozone levels at both locations are well below the 2008 NAAQS of 75 parts per billion (ppb). To cause a violation of the 2008 ozone standard this year, the monitors would need to record values 14 to 35 ppb higher than any fourth-high value in the last ten years (2002-2011).

Year	Appleton 4th High (ppb)	Design Value (ppb)	Green Bay 4th High (ppb)	Design Value (ppb)
2002	75	-	84	-
2003	75	-	77	-
2004	71	73	70	77
2005	79	75	79	75
2006	69	73	66	71
2007	75	74	82	75
2008	62	68	63	70
2009	64	67	65	70
2010	62	62	65	64
2011	72	66	65	65
Critical 2012	*94*	*76*	*98*	*76*

The Lake Michigan Air Director Consortium (LADCO) performed photochemical modeling for the region to assess the control strategies to bring the region into attainment. The analysis considered emissions from point, area, and mobile sources and determined the level of reduction in emission to achieve the NAAQS at every monitoring site. The available documentation provides tables showing the impacts at Wisconsin ozone monitors and the emission reduction levels needed to achieve those results. To examine the possible impact of Waupaca Foundry, the Round 4 emissions and modeling reports were reviewed (http://www.ladco.org/reports/control/modeling/).

To provide a range of impact, the total emission reductions within Wisconsin were compared to predicted changes in ozone concentration in Door County (a rural area expected to have limited local VOC reduction) and Milwaukee County (an urban area expected to have greater local VOC reduction). Using this data it is estimated that it takes from 17,349 tons per year to 25,604 tons per year of total VOC and NO_x reductions to result in a 1 ppb reduction in ozone concentration. Therefore, it is assumed that 17,349 to 25,604 tons per year of increased emissions would result in a 1 ppb increase of concentration. Note that this method assumes emission reductions in other areas in the modeling domain do not affect Wisconsin ozone concentrations. This is not actually the case, but results in a conservative estimate of the sensitivity of ozone concentrations to Wisconsin emissions.

Based upon the expected emission increase of 59 tons per year of VOC and NO_x, it is estimated that the increase in ozone concentration is between 0.002 ppb and 0.003 ppb. Considering that an increase of 14 ppb to 35 ppb in ozone concentration is necessary to cause a violation at nearby monitors, it is concluded that the potential increase of 40 tons of VOC and 19 tons of NO_x per year will not cause a violation of the ozone NAAQS.

	2002	2009	2009 to 2002	2012	2012 to 2002	2018	2018 to 2002
Typical Summer Day Emissions							
VOC	1005	909	-96	878	-127	862	-143
NO_x	1128	747	-381	647	-481	520	-608
Total	2133	1656	-477	1525	-608	1382	-751
Total Year	778545	604440	-174105	556625	-221920	504430	-274115
Modeled Ozone Concentrations (ppb)							
Milwaukee	91.0	84.2	-6.8	82.3	-8.7	78.7	-12.3
Door	91.0	81.8	-9.2	79.3	-11.7	75.2	-15.8
Tons per Day to Result in 1 ppb Change in Ozone							
Milwaukee			70.15		69.89		61.06
Door			51.85		51.97		47.53
Tons per Year to Result in 1 ppb Change in Ozone							
Milwaukee			25604		25508		22286
Door			18924		18968		17349
Change in Ozone (ppb) from 59 Tons Emission							
Milwaukee			0.0023		0.0023		0.0026
Door			0.0031		0.0031		0.0034

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: June 7, 2012

FILE REF: 4530
FID: 459005910

TO: Paul Yeung – AM/7

FROM: John Roth – AM/7

SUBJECT: Ozone Air Quality Analysis for a PSD Permit for Aaarrowcast - Shawano

A. INTRODUCTION

Ozone is a photochemical pollutant that is not generally emitted directly from sources, but is a secondary pollutant created through complex reactions, primarily from volatile organic compounds (VOCs) and oxides of nitrogen (NO_x). This complex chemistry is well understood but has historically presented significant challenges to the designation of particular models for assessing the impacts of individual stationary sources for the formation of this pollutant. Since formation of ozone takes place over tens to hundreds of kilometers downwind from sources, regional models have been developed to simulate ozone levels over large areas. These models have worked well and have been used to develop strategies for reducing VOCs and NO_x in order to attain the ozone ambient air quality standards. Changes from additions of individual sources have not shown any impact in these regional models.

Aarrowcast is proposing to increase their potential emissions relative to their historical actual emissions by 154 tons of VOC and 10 tons of NO_x per year. In addition, a prior PSD permit issued in 2011 increased VOC by 71 tons per year. The analysis set forth below demonstrates that the total increase of emission (235 tons per year potential increase over actual) would not have an effect on the attainment status of the area.

B. POINT SOURCE INVENTORY

Examining the point source emissions in the Shawano County area (Brown, Oconto, Outagamie, Shawano, Waupaca Counties) for 2010, VOC and NO_x emissions account for 13,997 tons per year. Aarrowcast's potential emission increase for both permits and both pollutants would represent 2.4% of the total of NO_x and VOC point source emissions for the region. If other potential ozone precursor emitting sources are included, such as biogenics, area, and on/off road mobile source emissions for this county, this would decrease the percentage of Aarrowcast's overall potential contribution for ozone formation. While production of ozone is not a linear relationship to emissions, analysis of Aarrowcast's emissions demonstrates the impacts of this project will be below detectable levels. Because it will only be emitting less than 2.4% of the emissions for the region, its ozone contribution would be minimal.

C. OZONE MODELING - LADCO

The closest ozone monitors to Aarrowcast are those located in Appleton (Outagamie County) and Green Bay (Brown County). Ozone levels at both locations are well below the 2008 NAAQS of 75 parts per billion (ppb). To cause a violation of the 2008 ozone standard this year, the monitors would need to record values 14 to 35 ppb higher than any fourth-high value in the last ten years (2002-2011).

Year	Appleton 4th High (ppb)	Design Value (ppb)	Green Bay 4th High (ppb)	Design Value (ppb)
2002	75	-	84	-
2003	75	-	77	-
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The Lake Michigan Air Director Consortium (LADCO) performed photochemical modeling for the region to assess the control strategies to bring the region into attainment. The analysis considered emissions from point, area, and mobile sources and determined the level of reduction in emission to achieve the NAAQS at every monitoring site. The available documentation provides tables showing the impacts at Wisconsin ozone monitors and the emission reduction levels needed to achieve those results. To examine the possible impact of Aarrowcast, the Round 4 emissions and modeling reports were reviewed (http://www.ladco.org/reports/control/modeling/).

To provide a range of impact, the total emission reductions within Wisconsin were compared to predicted changes in ozone concentration in Door County (a rural area expected to have limited local VOC reduction) and Milwaukee County (an urban area expected to have greater local VOC reduction). Using this data it is estimated that it takes from 17,349 tons per year to 25,604 tons per year of total VOC and NO_x reductions to result in a 1 ppb reduction in ozone concentration. Therefore, it is assumed that 17,349 to 25,604 tons per year of increased emissions would result in a 1 ppb increase of concentration. Note that this method assumes emission reductions in other areas in the modeling domain do not affect Wisconsin ozone concentrations. This is not actually the case, but results in a conservative estimate of the sensitivity of ozone concentrations to Wisconsin emissions.

Based upon the expected emission increase of 235 tons per year of VOC and NO_x, it is estimated that the increase in ozone concentration is between 0.009 ppb and 0.014 ppb. Considering that an increase of 14 ppb to 35 ppb in ozone concentration is necessary to cause a violation at nearby monitors, it is concluded that the potential increase of 225 tons of VOC and 10 tons of NO_x per year will not cause a violation of the ozone NAAQS.

	2002	2009	2009 to 2002	2012	2012 to 2002	2018	2018 to 2002
Typical Summer Day Emissions							
VOC	1005	909	-96	878	-127	862	-143
NO_x	1128	747	-381	647	-481	520	-608
Total	2133	1656	-477	1525	-608	1382	-751
Total Year	778545	604440	-174105	556625	-221920	504430	-274115
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Tons per Day to Result in 1 ppb Change in Ozone							
Milwaukee			70.15		69.89		61.06
Door			51.85		51.97		47.53
Tons per Year to Result in 1 ppb Change in Ozone							
Milwaukee			25604		25508		22286
Door			18924		18968		17349
Change in Ozone (ppb) from 235 Tons Emission							
Milwaukee			0.0092		0.0092		0.0105
Door			0.0124		0.0124		0.0135